Claims 112 p2

1. A light emitting device, having an input impedance and a device quantum efficiency, for generating at least one beam of output radiation from an input current of electrons comprising;

at least two light emitting means, each having an impedance and an individual quantum efficiency, for converting the input current of electrons into a beam of output radiation,

characterised in that the light emitting means are electrically connected such that the device quantum efficiency is greater than or equal to the individual quantum efficiency of one of the light emitting means.

2. The light emitting device of claim 1 wherein the light emitting means are electrically connected in series such that the input impedance of the light emitting device is substantially equal to the sum of the impedances of the light emitting means and wherein the quantum efficiency of the device is substantially equal to the sum of the quantum efficiencies of the light emitting means.

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3. The light emitting device of claim 1 wherein the light emitting means are electrically connected in any one of a parallel connection or in a series parallel connection.

4. The light emitting device of any of claims 1-3 wherein the light emitting means are electrically connected such that the input impedance of the light emitting device is substantially equal to 50 Ω without additional circuitry or impedance matching elements.

5. The light emitting device of claim 4, wherein each of the light emitting means have a modulation frequency limit and wherein the input impedance of the light emitting device is substantially equal to 50 Ω across a frequency range substantially from DC to the modulation frequency limit of each of the light emitting means.

6. The light emitting device of claim 1 wherein the light emitting means are p-n junctions.

7. The light emitting device of claim 6, wherein the p-n junctions are laser diodes or light emitting diodes.

8. The light emitting device of claim 7, wherein the laser diode devices may be any one of AlGaAs, AlGaInP, AlGaInAs or AlGaInAsP laser diode devices.

9. The light emitting device of claim 7, wherein the p-n junctions each have an end face coated with a reflective coating.

10. An optically coupled transistor for generating an output electrical signal comprising;

the light emitting device of any of claims 1-5 for emitting at least two beams of output radiation and

at least one photodetector for detecting the beams of radiation output from the light emitting device and for converting the beams of output radiation into an output electrical current.

11. The optically coupled transistor of claim 10 wherein the one or more photodetector is a photodiode device.

12. The optically coupled transistor of claim 10, comprising at least two photodetectors, wherein the photodetectors are connected in any one of a series connection, a parallel connection or a series parallel connection.

13. The optically coupled transistor of claim 10, comprising one or more optical fibres for transmitting the beams of output radiation to the one or more photodetectors.

14. A fibre optic link comprising one or more optical fibres having an input endface and an output endface, and also comprising the light emitting device of claim 4,

wherein the light emitting device is situated at the input endface of one or more optical fibres such that the beams of radiation output from the light emitting device are input to the one or more optical fibres.

15. A method for distributing an input signal into a plurality of output channels comprising the steps of;

(i) outputting two or more beams of radiation from the light emitting device of claim 1 comprising at least two light emitting means and

(ii) inputting each of the two or more beams of output radiation into one of the output channels,

whereby the light emitting means are connected such that the device quantum efficiency is greater than or equal to the individual quantum efficiency of one of the light emitting means.

16. The method of claim 15 comprising the step of inputting each of the two or more beams of output radiation into a different one of the output channels.

17. An optical repeater for receiving an optical input signal and generating one or more optical output signals comprising;

a photodetector for receiving the optical input signal and converting the optical input signal into an electrical signal and

the laser device of any of claims 1-5 for receiving the said electrical signal and outputting one or more optical signals.

18. The optical repeater of claim 17 and also comprising amplification means for amplifying the electrical signal output from the photodetector.